

Dr. Duke's Phytochemical and Ethnobotanical Databases

Chemicals found in *Borago officinalis*

| Activities Count | Chemical | Plant Part | Low PPM | High PPM | StdDev | Reference Citation |
|------------------|----------------------|------------------|---------|----------|---------------------|--|
| 0 | (-)-BORNESITOL | Plant | | | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 0 | 7-ACETYL-INTERMEDINE | Leaf | 0.1 | 0.1 | | -- |
| 0 | 7-ACETYL-LYCOPSAMINE | Leaf | 0.1 | 3.0 | | -- |
| 16 | ACETIC-ACID | Leaf | | | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 16 | ACETIC-ACID | Plant | | | | -- |
| 1 | ACETYLINTERMEDINE | Shoot | | | | Jim Duke's personal files. |
| 1 | ACETYLLYCOPSAMINE | Shoot | | | | Jim Duke's personal files. |
| 3 | ALANINE | Leaf | | | | Jim Duke's personal files. |
| 0 | ALKALOIDS | Leaf | 2.0 | 8.0 | -0.6091138813378191 | -- |
| 0 | ALKALOIDS | Seed | | 300.0 | -0.8008331835428224 | -- |
| 0 | ALKALOIDS | Plant | 2.0 | 98.0 | -0.4383926585856858 | -- |
| 12 | ALLANTOIN | Embryo | | | | Jim Duke's personal files. |
| 12 | ALLANTOIN | Seed | | 423.0 | -1.0 | Jim Duke's personal files. |
| 12 | ALLANTOIN | Root | | 49.0 | -0.7051198369303746 | Jim Duke's personal files. |
| 12 | ALLANTOIN | Sprout Seedling | | | | -- |
| 12 | ALLANTOIN | Leaf | | 61.0 | -1.0 | Jim Duke's personal files. |
| 12 | ALLANTOIN | Rhizome | | | | Jim Duke's personal files. |
| 15 | ALPHA-LINOLENIC-ACID | Seed Essent. Oil | | | | Jim Duke's personal files. |
| 1 | AMABILINE | Seed | | 20.0 | | Jim Duke's personal files. |
| 1 | AMABILINE | Shoot | | | | Jim Duke's personal files. |
| 1 | AMABILINE | Leaf | 0.1 | 3.0 | | -- |
| 0 | ARABINOSE | Plant | | | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |

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|------------------|-------------------------|------------|----------|----------|----------------------|--|
| 112 | ASCORBIC-ACID | Shoot | | 39.0 | -0.3692514552082671 | Jim Duke's personal files. |
| 112 | ASCORBIC-ACID | Leaf | 30.0 | 5005.0 | 0.020480126257650957 | -- |
| 3 | ASPARTIC-ACID | Leaf | | | | Jim Duke's personal files. |
| 53 | BETA-CAROTENE | Leaf | 25.0 | 360.0 | 0.42984159542352385 | USDA's Ag Handbook 8 and sequelae) |
| 0 | BORAGO-TRIACYLGLYCEROLS | Seed Oil | | | | Jim Duke's personal files. |
| 0 | BORNESITOL | Plant | | | | -- |
| 28 | CALCIUM | Leaf | 930.0 | 5005.0 | -0.9177892759006925 | USDA's Ag Handbook 8 and sequelae) |
| 0 | CARBOHYDRATES | Leaf | 30600.0 | 437580.0 | -1.3858995814533719 | USDA's Ag Handbook 8 and sequelae) |
| 20 | CHOLINE | Leaf | | | | -- |
| 2 | COBALT | Plant | | | | -- |
| 7 | CYANIDIN | Plant | | | | Jim Duke's personal files. |
| 0 | CYANOGENS | Leaf | | | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 0 | CYNAUSTINE | Shoot | | | | Jim Duke's personal files. |
| 9 | DELPHINIDIN | Plant | | | | Jim Duke's personal files. |
| 1 | DHURRIN | Plant | 35.0 | 350.0 | | -- |
| 2 | ERUCIC-ACID | Seed | 2500.0 | 7390.0 | -0.7373722556756456 | Heredity 65: 249-257. 1990. |
| 0 | FAT | Seed | 130000.0 | 383000.0 | 0.6195066267978355 | -- |
| 0 | FAT | Leaf | 7000.0 | 100000.0 | 0.8675702877100614 | -- |
| 15 | FIBER | Leaf | 9200.0 | 131560.0 | -0.3706742625139754 | USDA's Ag Handbook 8 and sequelae) |
| 8 | FRUCTOSE | Leaf | | | | Jim Duke's personal files. |
| 1 | GALACTOSE | Plant | | | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 20 | GAMMA-LINOLENIC-ACID | Seed Oil | | 249000.0 | -1.0 | Jim Duke's personal files. |
| 20 | GAMMA-LINOLENIC-ACID | Seed | 26000.0 | 84260.0 | 1.2128075738135886 | J. Pharm. Belg. 43:359-363. 1988. |

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|------------------|----------------------|-------------------|----------|----------|---------------------|--|
| 20 | GAMMA-LINOLENIC-ACID | Seed Essent. Oil | | 190000.0 | 0.9057529185791032 | Jim Duke's personal files. |
| 20 | GAMMA-LINOLENIC-ACID | Fruit Essent. Oil | 185000.0 | 240000.0 | | Jim Duke's personal files. |
| 20 | GAMMA-LINOLENIC-ACID | Leaf | | | | Jim Duke's personal files. |
| 7 | GLUCOSE | Plant | | | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 7 | GLUCOSE | Leaf | | | | Jim Duke's personal files. |
| 12 | GLYCINE | Leaf | | | | Jim Duke's personal files. |
| 9 | HCN | Plant | | 15.0 | | -- |
| 1 | HYDROXYPROLINE | Seed | | | | List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979. |
| 1 | INTERMEDINE | Leaf | | 0.1 | | -- |
| 1 | INTERMEDINE | Shoot | | | | Jim Duke's personal files. |
| 6 | IRON | Leaf | 33.0 | 472.0 | 0.2758179706263857 | USDA's Ag Handbook 8 and sequelae) |
| 75 | KAEMPFEROL | Plant | | | | Jim Duke's personal files. |
| 8 | LACTIC-ACID | Leaf | | | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 8 | LACTIC-ACID | Plant | | | | -- |
| 2 | LEUCINE | Leaf | | | | Jim Duke's personal files. |
| 27 | LINOLEIC-ACID | Seed Essent. Oil | | 360000.0 | -0.9883274356612421 | Jim Duke's personal files. |
| 27 | LINOLEIC-ACID | Seed | 45500.0 | 149370.0 | 0.36198337357431687 | -- |
| 0 | LINOLENIC-ACID | Seed | 25000.0 | 73000.0 | 0.6945369520909026 | Wealth of India. |
| 1 | LYCOPSAMINE | Shoot | | | | Jim Duke's personal files. |
| 1 | LYCOPSAMINE | Leaf | 1.0 | 3.0 | | -- |
| 65 | MAGNESIUM | Leaf | 520.0 | 7436.0 | 1.2782028442421007 | USDA's Ag Handbook 8 and sequelae) |

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|------------------|------------------------------------|------------------|----------|----------|----------------------|---|
| 15 | MALIC-ACID | Leaf | | | | Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp. |
| 15 | MALIC-ACID | Plant | | | | -- |
| 3 | MUCILAGE | Plant | 110000.0 | 300000.0 | 1.7081599483402181 | -- |
| 3 | MUCILAGE | Shoot | | | | Jim Duke's personal files. |
| 13 | MUFA | Seed | 74750.0 | 220225.0 | 0.8015642841623266 | J. Pharm. Belg. 43:359-363. 1988. |
| 39 | NIACIN | Leaf | 9.0 | 129.0 | 0.3831437055740252 | USDA's Ag Handbook 8 and sequelae) |
| 0 | OCTADECA-6,9,12,15-TETRAENOIC-ACID | Seed | | | | Jim Duke's personal files. |
| 0 | OCTADECADIENOIC-ACID | Seed | | | | Jim Duke's personal files. |
| 0 | OCTADECATETRA-6,9,12,15-ENOIC-ACID | Seed | | | | Jim Duke's personal files. |
| 0 | OCTADECATRIENOIC-ACID | Seed | | | | Jim Duke's personal files. |
| 0 | OCTADECENOIC-ACID | Seed | | | | Jim Duke's personal files. |
| 18 | OLEIC-ACID | Seed Essent. Oil | | 200000.0 | 1.4142135623730951 | Jim Duke's personal files. |
| 18 | OLEIC-ACID | Seed | 22100.0 | 100000.0 | -0.1570414967328784 | -- |
| 13 | PALMITIC-ACID | Seed | 15600.0 | 46600.0 | 0.26190815437347253 | -- |
| 4 | PHOSPHORUS | Leaf | 530.0 | 7579.0 | 0.47975440555798987 | USDA's Ag Handbook 8 and sequelae) |
| 14 | POTASSIUM | Leaf | 4700.0 | 67210.0 | 1.6279167435353101 | USDA's Ag Handbook 8 and sequelae) |
| 0 | PROTEIN | Leaf | 18000.0 | 257400.0 | 0.4544546487699197 | USDA's Ag Handbook 8 and sequelae) |
| 0 | PROTEIN | Seed | | 209000.0 | -0.22057386196586456 | -- |
| 4 | PUFA | Seed | 27300.0 | 80430.0 | -0.19333848445579574 | J. Pharm. Belg. 43:359-363. 1988. |
| 0 | PYRROLIZIDINES | Plant | 2.0 | 100.0 | | -- |
| 176 | QUERCETIN | Plant | | | | Jim Duke's personal files. |
| 0 | RESIN | Plant | | | | -- |
| 15 | RIBOFLAVIN | Leaf | 1.0 | 21.0 | -0.07942432526480918 | USDA's Ag Handbook 8 and sequelae) |
| 57 | ROSMARINIC-ACID | Plant | 500.0 | 7000.0 | -1.2991752308715747 | Fitoterapia No.62: 166. |

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| 57 | ROSMARINIC-ACID | Shoot | | 500.0 | -0.8320524588716441 | Jim Duke's personal files. |
| 57 | ROSMARINIC-ACID | Inflorescence | | | | Jim Duke's personal files. |
| 5 | SAPONINS | Leaf | | | | Newall, C. A., Anderson, L. A. and Phillipson, J. D. 1996. Herbal Medicine - A Guide for Health-care Professionals. The Pharmaceutical Press, London. 296pp. |
| 1 | SERINE | Leaf | | | | Jim Duke's personal files. |
| 1 | SERINE | Sprout Seedling | | | | Jim Duke's personal files. |
| 0 | SFA | Seed | 21710.0 | 63960.0 | 0.05001349654521198 | J. Pharm. Belg. 43:359-363. 1988. |
| 1 | SILICIC-ACID | Plant | 15000.0 | 22000.0 | -1.0451241158585747 | -- |
| 1 | SODIUM | Plant | 800.0 | 11440.0 | 0.3291979572172995 | -- |
| 8 | STEARIC-ACID | Seed | 6110.0 | 18000.0 | -0.17485116289238925 | -- |
| 0 | STERIDONIC-ACID | Leaf | | | | Jim Duke's personal files. |
| 0 | SUPINIDINE? | Leaf | | | | -- |
| 4 | SUPININE | Shoot | | | | Jim Duke's personal files. |
| 4 | SUPININE | Leaf | 0.1 | 3.0 | | -- |
| 0 | SUPININE-VIRIDIFLORATE | Plant | | | | -- |
| 0 | SUPININE-VIRIDIFLORATE | Leaf | | | | Wealth of India. |
| 35 | TANNIN | Plant | | 30000.0 | -0.783056468120132 | -- |
| 0 | THESININE | Seed Oil | | | | Jim Duke's personal files. |
| 0 | THESININE | Flower | | | | Jim Duke's personal files. |
| 0 | THESININE | Seed | | 200.0 | | -- |
| 31 | THIAMIN | Leaf | 1.0 | 9.0 | 0.144911649453059 | USDA's Ag Handbook 8 and sequelae) |
| 3 | VALINE | Leaf | | | | Jim Duke's personal files. |
| 0 | WATER | Herb | 0.0 | 930000.0 | -1.412953309430929 | USDA's Ag Handbook 8 and sequelae) |
| 77 | ZINC | Plant | | | | Abstract (See species file) |